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ABSTRACT

How can we conduct research when circumstances do not fit the requirements of formal research methods? What does it mean to say that results of research are valid and robust? What are the real products of research anyway? The term research has been appropriated in education by people with a vested interest in their own formalized methods and expertise. Yet formal education research has had very little impact on the practice of individuals, certainly in relation to the amount of moment spent. What is needed is an approach to research which enables ordinary practitioners to make sensible decisions about their own practice, informed where possible by indications of possibilities arising from the work of colleagues. An approach which meets these needs can be constructed based on the natural acts of just plain folks, by addressing the questions of the title. This approach draws upon traditions in which assertions are considered to be made for particular people at a particular time in a particular place, rather than having some objective validity, and in which assertions are merely signals or stimuli to make distinctions previously not made. Furthermore, validity is a matter of testing things out in past, present, and future experience, not one of accepting what someone else says because they claim to have proved it in some other context. (Author)

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THE EPISTEMOLOGY OF JPFs:
WHEN IS RESEARCH IN MATHEMATICS EDUCATION VALID, FOR WHOM, AND UNDER WHAT CIRCUMSTANCES?

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ABSTRACT

How can we conduct research when circumstances do not fit the requirements of formal research methods? What does it mean to say that 'results' of research are valid and robust? What are the real products of research anyway? The term *research* has been appropriated in education by people with a vested interest in their own formalised methods and expertise. Yet formal educational research has had very little impact on the practice of individuals, certainly in relation to the amount of money spent. What is needed is an approach to *re-search* which enables ordinary practitioners to make sensible decisions about their own practice, informed where possible by indications of possibilities arising from the work of colleagues.

An approach which meets these needs can be constructed based on the natural acts of *just plain folks*, by addressing the questions of the title. This approach draws upon traditions in which assertions are considered to be made for particular people at a particular time in a particular place, rather than having some objective validity, and in which assertions are merely signals or stimuli to make distinctions previously not made. These can be systematised into a research practice for *just plain practitioners*. Furthermore, validity is a matter of testing things out in your own past, present, and future experience, not one of accepting what someone else says because they claim to have 'proved' it in some other context.

INTRODUCTION

Colleagues all over the world find themselves in research situations which are in conflict with their immediate concerns: social-instability makes sampling impossible; subjects given a pre-test or interview are dispersed or unavailable for follow-up study; social and personal factors such as insufficient food to concentrate strongly influence any attempts to validate or develop general theories about teaching or learning; and social responsibilities beyond the school take up available time and energy. Such factors render the controlled conditions of rationalist cause-and-effect-based enquiry as at best inappropriate.

In this paper I suggest that there is an alternative approach to research, located through closely interrogating experience in the following way.

> By attending to and describing how most of us learn most of the time, we can then refine that description to produce a systematic method founded on an epistemology which reflects the everyday approach of 'just plain folks' like ourselves. This is the epistemology which actually lies at the heart of research paradigms as well as of everyday practices.
>
> Those practices bring a form of research within the grasp of unusual circumstances by allowing the researcher to investigate their own lived experience.
>
> The real product of research is the enhanced and refined sensitivity of the researcher to notice aspects and subtleties previously overlooked.

The term *just plain folks*, or JPFs for short, was introduced by Lave (1988) to refer to ordinary 'everyday' people, and their normal 'everyday' practices, untainted by

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academic analysis. Brown, Collins & Duguid (1989) contrasted JPFs, students and practitioners as follows (taken from Bronack 1999):

	JPFs	*Practitioners*	*Students*
Reasoning with:	casual stories	casual models	laws
acting on:	situations	conceptual situations	symbols
resolving:	emergent problems and dilemmas	ill-defined problems	well-defined problems
producing:	negotiable meaning & socially constructed understanding	negotiable meaning & socially constructed understanding	fixed meaning & immutable concepts

Theorisers construct discourses consisting of technical terms which generalise experiences, and theories expressed using those terms, which are intended to integrate and abstract apparently disparate phenomena. Unfortunately the discourse can become separated from the originating experience, from the originating situation, in which case it usually turns into empty jargon. The terms create abstract de-situated phenomena through the use of inevitably generalising words, and it takes very little to develop ontological commitment to labels. They can even become the object of study itself, in a *transposition recherche* (following the *transposition didactique* of Chevellard 1985).

Alternatively, with a little work, technical language can remain situated, acting as a focus or seed crystal for accreting a rich web of different past and future experiences which come to be seen as having something in common. I shall argue that this is actually what practitioners and theorists do as well, being, in fact, JPFs themselves.

Those who encounter theories propounded by others have to find some way to re-particularise the general, to re-situate the de-situated, to link their own experience to phenomena being abstracted. Again this requires work, but it can be done.

What is perhaps overlooked is that JPFs are much more sophisticated than the table suggests, for their 'casual stories' emerge through a process which is mirrored in the practices of practitioners and theorists. They check past expererince for confirmartory or contradictory expereinces, they re-articulate the story in their own words generated from their own expereince.

My intention is to describe and then extend the epistemology and methods of JPFs, that is, of all of us most of the time and most of us all of the time. This even includes researchers who pride themselves in some specific epistemological position and in strict methodical practices, and yet who only use these when performing in a professional context.

Despite elaborate articulations of method and epistemology, I suggest that there is a great deal in common in how people approach making sense of the world, finding out what seems to be the case, and validating what they find. Whether they say they believe there is a truth to be found, a 'something that is the case', or whether they espouse a highly relativist position, they all actually act in the same way. This 'way', when made precise and when employed systematically, constitutes an approach to *re-search* which empowers ordinary practitioner JPF's.

I begin by elaborating on the issue of validity.

VALIDITY: FOR WHOM, AND UNDER WHAT CIRCUMSTANCES?

Traditional Rationalist Approaches

Western rationalist philosophy can be read as a struggle to find a method which guarantees finding the truth about situations by locating 'what is the case'. The problem is to eliminate the possibility of being swayed by false or incomplete reasoning, by charismatic appeal to emotion, by social conditioning etc.. Of course, no such method has ever been discovered. Indeed, current philosophical positions would argue that no such method is possible, by observing that no method of ascertaining knowledge can be value or culture free, and so all methods are circumscribed and constituted by the language in which they are expressed, and the values which they manifest.

Aristotle, Euler, Leibniz, Descartes, and Boole were typical explorers in the long search for universal validity. They were all insightful mathematicians who expressed a desire to formalise philosophical argument in mathematical terms so that there could be no dispute about validity. But ordinary philosophy resists the rigour of mathematical argument, for axiomatisation is rarely possible. Axiomatisation is certainly inappropriate in mathematics education, where the 'objects' under discussion are often ephemeral and invisible, and have to do with human beings, not relationships between mentally imagined concepts.

Post-modernism tries to convince us that there is no global story, no objectivity, no truth to be found. Yet for many people, particularly those who have engaged in mathematical research, this flies in the face of experience. When the intermediate value theorem is proved for continuous functions on a closed interval, there is more than a just little frisson of 'gotcha'. Some mathematical situations are not in rapid flux, and so some assertions are more appropriate, more valid than others; some 'truths' have at least a sense of permanence. In mathematics education too, there are invariances amidst change, even if they are, in the long term, relative. For example, the children in a classroom I observe do not score very highly on the tests that they sit; many research students I have met have collected a lot of data, and only then seriously addressed the question of what they were going to do with it. Neither are universal, but both have a validity at a certain time and in a certain place, for me.

Post-modernism is in part a reaction to Popper's Objectivism (Popper 1972), but there are ways to counter Popper other than by denying a sense of truth altogether. Popper wanted to escape the flurry of un-testable, un-attackable theories which were popular in post-war Europe (as they are again, for example creationism, linguistic hegemonism, and constructivism in its various forms), and so he developed the notion that theories have to be falsifiable, in the sense that one has to be able to imagine how the theory might possibly be proved wrong in order for it to be considered part of a scientific contribution to knowledge. Post-modernism has taken thestance that there is no objectivity, no universality, with the concomitant effect of tempting people to abandon all criteria for knowledge.

If educational research could be formalised mathematically so that assertions were either true or false in Popper's sense, then we might be able to adopt his perspective. But it would mean that we lived in a totally mechanised, robotic world with no place for the creative, complex, organic responses of human beings to hazard. We would long ago have found the 'best way to teach mathematics' so earnestly sought by politicians. For any reasonable assertion in mathematics education, it is possible to construct an alternative interpretation in which it is false, or to imagine a circumstance in which its negation is also true. For example, "practice makes perfect" seems reasonable until we recollect that millions of children have practices to no avail. Practice improving

performance is only valid when the practice draws attention away from that which is practiced.

Traditional Humanist Approach

Eastern philosophical and psychological enquiry has much in common with humanistic phenomenological enquiries into 'lived experience,' into 'what it is like to be or to experience' something (van Maanen 1990). Instead of demanding that a theory must be falsifiable, there is a long tradition of localism: what is said is taken to be at best valid at that time in that place for those people. It is the responsibility of individuals to test out assertions in their own experience (that it makes sense of or fits with the past and present, and that it informs the future). Furthermore, assertions made are only contributions to the development of sensitivities to notice, and to the development of awareness of aspects and subtleties not previously noticed. For example, work on gender issues which heightens teacher sensitivities to their own behaviour is much more valuable than assertions about the presence of gender bias in classrooms in general. Neither are fruitful unless alternative behaviours are available in the moment when needed.

Validity for JPFs

Validity for most people in most situations, that is, for JPFs, is similarly temporary and situated, even though it may be experienced in the moment as universal. For example, when I find myself noticing a particular behaviour during some observations in a classroom, my awareness is dominated by that behaviour; I experience it as universal, as 'being the case', and I tend to see it everywhere. But later I may 'get it in perspective'. I may recognise that what I am observing is revealing something about my sensitivity to notice, about what I am atuned to observe, as much as it is about what is observed.

Observation is usually accompanied by ontological commitment, signalled by that sense of universality. Goethe (1810) suggested that "In every attentive look on nature we already theorise", while Stoppard (1988) rephrased it as "The act of observing determines reality . . .; You get what you interrogate for". For example, when I am caught up in looking for some particular behaviour in a group of subjects I am researching, I am inclined to see 'it', and to assert that 'it' is present (e.g. beliefs, attitudes, abilities, etc.). But the 'it' may be my own ontological construction in order to make sensew of, find similarity in, and account for, what I observe. Furthermore, when I show data to others, they may see other things, and have alternative interpretations. The 'truth' about data is that it serves as a mirror to reveal the observer's sensitivities to make certain distinctions, or as Storm (1985) put it in the context of North American Indians, "The world is a mirror for the people".

As researchers we want to see 'what is there', but this implies a commitment to something being there to be seen. An alternative, which corresponds more closely to experience of data collection and analysis, is that events consist of the multiple stories that are woven about observations, including by those who only have access to later versions of the stories. For example, Piaget and Freudenthal both made observations about their children or grandchildren, but many of their accounts are immediately recognisable even by those of us who never met their 'subjects'. They resonate with our own experience. The stories they tell are augmented by our own stories, creating a rich fabric of meaning which is taken as shared in a growing community.

The fact that something 'feels' true does not make it true. That is why it is vital that we check assertions not just against our own experience, but against the experience of others. For example, Bruner (challenges the much repated notion that young children are self-centred, by proposing that $$$.

The notion of triangulation is an example of an attempt to use a mathematically rigorous method, by analogy, to create rigour in observation. It brings others into the validation

process, but as traditionally employed it raises more questions than it answers about who is interpreting what from what framework. Getting different observers in different roles to validate an observation or conjecture begs the question of what those others are sensitised to notice and remark upon as a result of their different roles. Unless there is a specific training programme which obtains considerable agreement in the interpretation of data (as in Perry 1968), it is hard to coordinate the perspectives of different individuals, especially where they come from different communities.

Perry (*op cit*) provides a paradigmatic example of effective triangulation. He trained analysers to recognise epistemological positions in the transcripts of interviews, and showed that there was a high measure of agreement. Then he set them loose on the main data, and continued to get a high degree of agreement. Perry presents his findings as findings about the undergraduates. But the findings can also be interpreted as being about the sensitivities of the panel of analysers, and consequently, as potential for the sensitivities of readers. As a result of his research, those who read the book may find themselves sensitised to notice different epistemological and ethical stances in students' utterances, indeed in theb utterances of colleagues, and even of themselves. Being sensitised to these distinctions, they may notice new possibilities to choose to act in response to individuals (Copes 1982). Thus the effect of the research is to inform practice through sensitising one to notice. But all such noticing is only a first order phenomenon which has to be checked out and put in its place as but part of a larger picture, as just one reading of a situation which may be multiply construed. The purpose of checking out an assertion is not, as is commonly assumed, to validate it, but rather to develop the sensitivity in ourselves to notice whatever it is the assertion draws to attention, so that we can see if that awareness informs past, resent, or future. When we check out with others, we are checking whether they can develop a similar sensitivity, or at least whether they can report on what they notice using the same language! Asking a direct question about what people notice or are aware of is not usually very effective, since they are most often embedded in and caught up *in* that awareness, but not aware *of* it. A more effective way is to construct and refine task-exercises through which others reveal what they notice, and through engaging in which they become sensitised.

The age-old concern is that we might convince colleagues through charismatic intensity. But there is no antidote, no guarantee of neutrality and validity. Each of us is responsible for checking that what is offered makes sense, or challenges constructively, the stories we have already woven. As Goodman (1978) famously said, "we hope that our theories are as fact-laden as our observations are theory-laden". Each of us is responsible for seeing whether it fits with present experience, and whether it informs future actions.

Of course each of these three domains (past, present, and future) are circumscribed by practices of the communities in which we are embedded including personal habits of behaviour and of perspective, and by the pre-judices we have developed from the stories we have heard and woven in and about the past. Our desire to be accepted within a community, which sometimes includes desire to disagree, may result in stressing some features through activating certain awarenesses, while ignoring others. The only recourse we have is to remain in question, to keep as much conjectural as possible, continually checking against our own experience, and seeking new people with whom to test out conjectures.

If something fails to check out, fails to make sense of the past or present, fails to inform the future, then it may be that there is something inappropriate in the distinction-assertion-awareness, but it may also be that it is not appropriate at that time in that place for that person. When there is a strong reaction against something proposed as worthy of noticing, it is more likely to be a signal of an imminent significant shift of attention,

than when there is a warm acceptance. Disturbance is more creative than flow, as long as the disturbance is not excessive.

For example, most teachers are caught up in the exigencies of the immediate teaching and administration, and so find the thought of working-on-their-practice an unnecessary additional burden. It is only when they experience a dissatisfaction, a disturbance in the flow of lessons or in the responses of students, that they begin to question themselves and the system. Only then are they likely to make sense of suggestions which they have heard in the past about alternative practices or perspectives. Teachers caught up in a fluid socio-political situation may not be in a position to attend to subtleties in approaches to task design. They may appear not to heed what they are offered, just as children may appear not to heed grammatical corrections or other comments made by an adult, yet later they suddenly incorporate what they were told. When your 'message' is not heeded in the present, it may be useful to trust in the complex organic nature of human beings that they will later be in a position to respond to and develop sensitivities which are currently inappropriate.

I suggest that sensitivity-based localism is how we all operate when in JPF mode. By elucidating and refining this epistemology, we can arrive at an approach to knowledge-development which can be as systematic and methodical as one likes, and which may be applicable in situations where traditional research methods are inappropriate. The result is an approach to *re-search* which fits with much of modern theorising, which admits a relative objectivity in time, place, and person, and which supports the education of awareness, that is, the strengthening, broadening, and refining of sensitivity to notice.

In summary then, research in mathematics education results in heightened and precised sensitivities to notice, in the researcher. The most valuable products of that research are devices such as task-exercises and assertions, which stimulate others to notice similarly. Disturbance is a central mechanism. Validity is the responsibility of the individual, within the practices of the community, to test out in their past, present, and future experience, and in the experience of others. Validity is person, place, and time dependent, and concerns the sensitivity to notice in emergent situations, not facts about situations before they happen.

It is perfectly natural to seek a rigorous method so that if the steps are correctly followed, the results will be valid. It is perfectly reasonable to expect that someone else could 'inform' you of what is the case, from their own researches. But in education this is simply not possible, because every educational context is unique, and fluid. There could only be clear and unambiguous 'answers' if situations were stable and subject to cause-and-effect, that is if they were mechanical. Human beings, despite acting mechanically much of the time, are essentially creative and subject to hazard.

THE EPISTEMOLOGY OF JPFS

This section consists of a brief summary of some of the reasoning which justifies my claim to be describing the epistemology of JPFs. I have chosen those aspects which seem most relevant to conditions in which traditional research methods appear to be inappropriate.

Disturbance triggers attention, awakening-to-detail, and hence awareness;

> We spend most of our time caught up and immersed in activity. Expertise requires the growth of an inner monitor separate from the action. E.g. when you suddenly become aware while interviewing; 'My questions are shaping this person's responses", your monitor may be waking up.

Noticing (awakening, awareness) is based on making distinctions.

Noticing literally means 'to make a distinction'. For example, you suddenly find yourself distinguishing different postures or gestures that children or teachers are using, or different ways they respond to each other.

Resonance is an essential and on-going need for human beings

As human beings we seek the affirmation of colleagues as part of our on-going re-need for acknowledgement and hence reassurance of our existence and worth (our reality). We join social groupings (such as conferences) because we expect to get strokes from folks we respect and with whom we share ideas and ideals. We seek resonance (and in extreme cases, dissonance) from those we respect, but we tend not to respect those from whom we obtain resonance too easily! There is a delicate balance between criticism and acceptance.

Resonance is also how ideas come to us, for something in the current situation links with and triggers associations which include particular words, thoughts, and acts, both those we have tried and those we wish we could remember to try.

To make a distinction requires resonance with past experience

To make a distinction requires some features to be stressed or brought to the fore-ground while others are ignored or back-grounded. The identification of 'thing' which is stressed, is based on prior experience, since something that is unrelated to anything experienced in the past cannot actually be seen.

Sensitivities can be intentionally developed, and are influenced by social and psychological forces

The researcher is the one who, through a process of asking questions and seeking answers, becomes sensitised to details of issues which others overlook because they lack those sensitivities.

Both education and research could be seen as the development of sensitivities and accompanying actions, techniques, skills. Thus research is a form of self-education. Publication is an archaic practice, necessary because of links to reward and status. What affects others are distinctions and practices to try out.

Sensitivities do not reside purely in the individual. They are perhaps most appropriately seen as co-emergent mutualities between individual, (socio-cultural) context, and situation. They arise from, are mediated by, and manifest themselves in language, especially the language of a specialist community. Thus mathematicians can speak to each other using words that non-mathematicians do not even recognise. The use of those words triggers in the listener ways of thinking, concept-images, and past experience (in the form of theorems and proofs and examples) to move closer to a firing threshold. That is, they trigger sensitivities to act and perceive.

Noticing can lead to action, (including apparent inaction), and activity.

Non-habitual acts require that a possible act should come to mind in the moment just before a habitual act is triggered. I need to notice that I am about to ask a typical question, to repeat back what a pupil has said, to raise my voice, etc., just before I actually do it. I also need an alternative to employ. It is not sufficient that alternatives have simply been 'seen in the past'. They have to come to mind, as part of awakening to the situation in the moment. Only then can noticing lead to action (including a choice not to act). The point is to experience a moment of choice, a moment of liberation, not be subject to habitual reactions and automatic behaviours built up over many years.

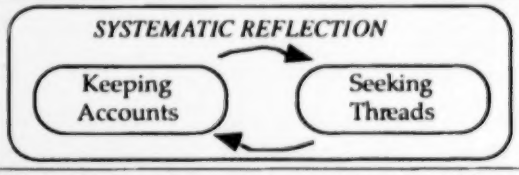
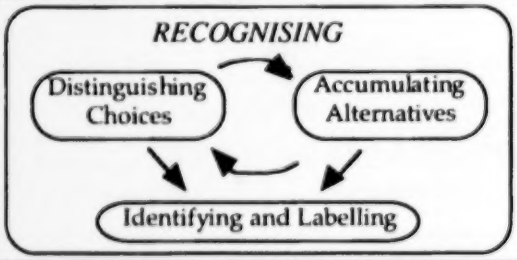
Humans have natural powers of thought and action which include ways of testing assertions

They do this by testing against both specific and generalised past experience, expectation and 'history', against current experience, and against whether future

actions are informed. Only when these are satisfied can we say that we have 'learned something'.

TOWARDS METHOD THROUGH REFINEMENT OF THE EPISTEMOLOGY

The assertions so far refer to JPFs and their epistemology. But when these are refined into actions and made more systematic and methodical, a research-method emerges. This has been elaborated elsewhere (Mason 1994, 1997, 1998) so it is inappropriate to do more than briefly summarise it here.

<table>
<tr><td>Selecting and honing descriptions which others instantly recognise; refining task-exercises which highlight fruitful issues or sensitivities.</td><td> 
</td></tr>
<tr><td></td><td>Noticing, marking, and recording brief-but-vivid moments, and considering what might have been done, in retrospect; imagining oneself carrying them out can make it more likely that they come to mind in the moment in the future.</td></tr>
<tr><td>Being alert to the actions of others, as distinct from the effects of those actions, helps extend the range of gambits upon which you can draw.
Identifying and labelling typical situations can help recognition occur in the future.</td><td> 
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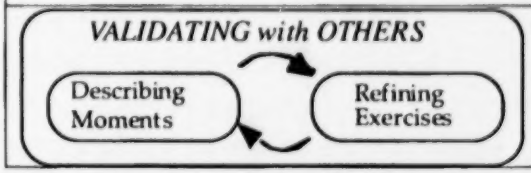
<tr><td> 
</td><td>Selecting and honing descriptions which others instantly recognise; refining task-exercises which highlight fruitful issues or sensitivities.</td></tr>
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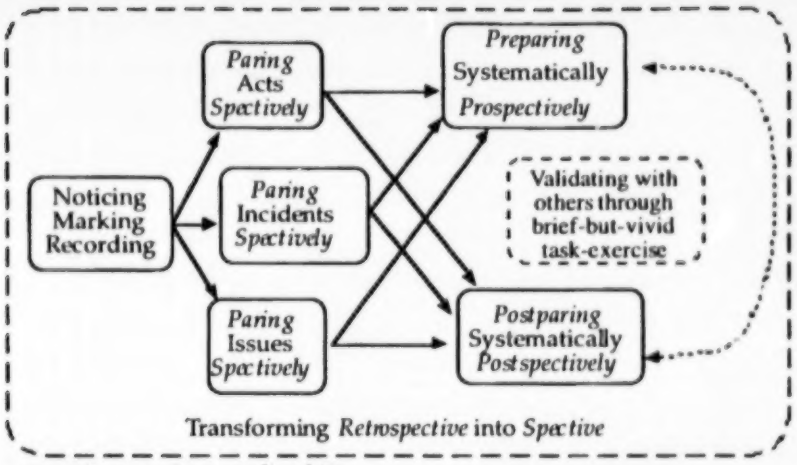
It is important to emphasise that these four aspects are neither stages nor phases, neither cyclical nor linear. They are actions in which one engages somtiomes individually, sometimes several at once. The discipline can also be summarised as in the following diagram, making use of the structure of English words and their Latin prefixes. Thus *spection* is the root meaning of *inspection* and appears in words such as *spectacles, speculation,* and *retrospective,* all to do with seeing. *Spection* means observing in the moment, *au point. Paration* is the core of *preparation,* and has a sense of being awake in the moment, so that preparation is what you do in advance, and *postparation* is what you do afterwards, akin to *reflection,* which means looking back. Reflection in the discipline of noticing has a technical meaning, incorporating re-entering (through the power of mental imagery, supported by any notes or other available records) salient moments, re-experiencing them, and imagining oneself acting either the same way again in the future, or differently. Participation in noticng can be enhanced by work on acts one performs, incidents in which one participates, and issues over which one is concerned.



A few extra remarks may be worth while.

Distinguishing the phenomenon (what is noticed) from explanations and valuations is vital

You cannot evaluate someone's assertions if you cannot distinguish the phenomenon (their account-of) from explanation and theorising (accounting-for). Thus it is vital to work at description which is as value-free as possible. This means that the description is recognisable by others who were present, and more generally, by others with requisite experience. This requires effort and is non-trivial. It requires separation of personal investment from negotiable agreement.

You can never escape the cycle of 'requisite experience in order to achieve recognition in order to have requisite experience', but you can endeavour to extend the range of generality by seeking resonance with ever wider circles of people, just as mathematical justification is a refinement of convincing yourself, then a friend, and then a reasonable sceptic.

Constructing task-exercises in order to facilitate others noticing

To link with past experience, people need some present experience which then summons up the past, initiating or enriching a web of connections which will in time inform future actions. Constructing task-exercises and then refining them in the light of experience is the principal means by which resonance is sought with others, and through which others are initiated into refining their sensitivities.

There is always the possibility that particular people are not in a position to recognise what is being offered. Similarly there is always the possibility that the exercise is inadequate or inappropriate for enabling others to make the distinctions you make. It is also possible that you are deluding yourself in the distinctions you are making.

Methodical evaluation is checking out against past, present, and future experience.

The efficacy and appropriateness of some suggestion, some detail to distinguish, detect, notice, and act, is validated by whether it informs the future, whether you find yourself noticing, and thereby empowered to act.

Informing the future is not trivial

It is not simply a matter of remembering to notice. Rather, it entails alteration of the structure of your attention so that noticing takes place. At first you tend to notice 'after the event', as in the clever reply you think of only when the event is over. Mostly we notice opportunities to 'have acted' once the moment has

passed. The challenge is to move retrospective awareness into noticing in the moment, as an event unfolds, so that you are indeed empowered to act. ^This is the core of the discipline of noticing.

Noticing involves the interweaving of all aspects of the psyche with observation and action, in contrast to other forms of research which are detached and objective.

Noticing systematically involves harnessing affect and training enaction in order to educate cognition. It involves seeking out habits that may not be as effective as possible, and locating alternative acts to initiate, actions in which to participate, and activities in which to engage. It requires engaging will and intention in order to be awake to possibilities in the future, and the perspicacity to work at moving retrospective noticing into the moment when it matters.

Noticing is not an extra-spective act, but an in-dwelling, an in-habiting

Observation is usually thought of as one person observing something else. However there are gigantic philosophical difficulties to overcome regarding predispositions of the observer and their ontological commitments. Issues of validity rise rapidly to the surface. But when observation is thought of as part of the state of the individual (as in the two birds), there is a sense of simultaneously being 'outside oneself', as Gadamer puts it (1975 p111), and yet integral to oneself, because one is wholly with the observed. For example, when a question is asked about some issue in mathematics education, everyone immediately interrogates their own experience to see what 'it' tells them. The more they have in-dwelt and reflected, both upon and within, in the past, the more vibrant the images that are likely to be resonated to the surface, and the richer the web of connections to be triggered.

Objectivity in noticing arises from finding that others recognise and notice what you notice, and find it informative in the future.

A form of external objectivity is achieved through in-dwelling subjectivity, then constructing task-exercises which enable others to notice what you have noticed. Generality resides in the frequency of appropriateness experienced in the future.

Noticing, evaluation of fit with past, present or future experience are all forms of observation and hence of interpretation.

The traditional dilemma of all observation being theory laden takes on a fresh slant from the point of view of noticing. For interpretation assumes an external objective event, whereas all we can be sure of is different stories told by different participants. From the perspective of 'lived experience', there is no 'observation of the world' for 'the world' is a construct which arises only when I try to separate myself from my environment, whether social, cultural, physical, or psychical. My experience is one and the same with 'the' or 'my' world. What is amazing is that we can negotiate so much commonality with others about our respective worlds. This is what gives us confidence to generalise, to offer distinctions to others.

Gadamer (1975) suggests that 'understanding is always an interpretation, and hence understanding is an explicit form of interpretation' (p274). Experience itself is a form of interpretation; stories woven in response to experience both augment and become that experience. Hence the strong influence of the practices (particularly of language) of community.

An event is the collection of stories told about (hopefully negotiated between) participants.

It is not that there is an event and that different people see 'it' differently. Rather, there was no single event, just a collection of lived experiences, re-enterable by individuals as fragments of remembrance past, and negotiated with others

through telling stories. Events take on meaning only when an individual means them to, in the sense of experiencing an action in which event-as-lived is worked upon or worked over by a cognising agent.

What is noticed, is as much a propensity of the observer as a fact about the observed

Since noticing is about making distinctions, which are manifestations of personal but co-emergent sensitivity, not a reflection of how some external world is structured, what is noticed is a property of the individual in a situation, not a general feature of the person, nor of the situation, alone.

What is learned from 'research' is as much about the researcher as it is about the researched.

The researcher is the one transformed by partic tion in an action of meaning-making. Their sensitivities to notice are enhanced. The more detail one tries to extract from a research report about what was reseached, the more one has to take into account corresponding details about the researcher's predilections, predispositions, prejudices; about their ideology and stance

The assertions so far refer to JPFs and their epistemology. But when these are refined into actions and made more systematic and methodical, a research-method emerges. One such has been elaborated elsewhere as the Discipline of Noticing (*op cit*.

All research involves

- Recognising and formulating a question; formulation takes place within a discourse and a practice, and so privileges associated methods;

Questions concerned with personal change or development find resonance within the discipline of noticing, since trying to change others is doomed to trivialisation, superficiality, and failure in the long run. But all research has an element of sensitisation to notice.

- Articulating a method whereby investigation can be systematic and replicable (in the sense that others can investigate similarly);

The Discipline of Noticing provides such a systematic method. It depends on clarifying the phenomenon (through brief-but-vivid accounts of incidents that others can recognise), collecting alternative actions to employ, and working to employ those actions in the future. Distinguishing the phenomenon (what is noticed) from explanations and valuations, is vital.

- Bringing data into existence by 'collecting' it and nominating it as such;

Data in noticing consists of brief-but-vivid accounts and distinctions that appear fruitful; it also includes responses from colleagues who are invited to engage in task-exercises etc..

- Analysing data;

Data can be analysed through seeking patterns or threads, which form the basis for more general claims and

- Crystallising, abstracting and generalising through seeing data as generic;

Noticing is most effectively disseminated in the form of task-exercises accompanied by attention drawn to distinctions, frameworks, or challenging assertions.

- Validating assertions through some form of logic (rational argument, statistical reasoning, or experiential evocation);

Distinctions are validated by the user as described in the earlier sections. Other paradigms present other forms of products and use other forms of validation.

Sensitivities can be intentionally developed, and are influenced by social and psychological forces, but sensitising yourself to notice is a great deal harder than appears at first sight. Intentional 'work' is hard to maintain without a supportive

community because the mechanicality of habit is very strong. Sensitivities do not reside purely in the individual. They are more appropriately seen as co-emergent mutualities between individual, socio-cultural context, and situation.

FINAL REMARKS

As JPFs we try to make sense of what strikes us. We make sense of much of what impacts us by ignoring, since it does not conflict with or disturb our equilibrium. What we experience internally *is* our version of events. The fragments of experience are woven into stories which account for, that is, make sense of, and hence become, that experience.

As JPFs we make sense by employing natural powers such as

> Responding to generalities by particularising (seeking examples) in our own experience, and generalising the particulars of our own experience to see if it makes sense of, fits with, or challenges in some way, that experience;
>
> Recalling the past (as stories woven from fragments of experience) and imagining the future (acting in non-habitual ways);
>
> Expressing the past and future by weaving stories, some of which appear as propensities to act (to respond or react), and some of which appear as analysis or theory. These can be verbal, visual, aural, and physical or with symbolic as well as iconic and enactive layers of personal meaning.

Experience itself consists of the stories woven around striking incidents, and these stories are developed, elaborated and proffered to communities thorough re-vivifying in oneself, and re-telling to others. Audience response mediates both story and future recounting, and hence modifies 'the' event itself.

The social and the psychological are deeply interwoven in complex ways, for resonance with others is a major driving force for the psyche (in relationships, in self-image, in professional and social activity). Resonance comes about through concensual coordinations of actions (carrying out practices in an outwardly consistent manner) and, as Maturana (1988) has pointed out, through concensual coordinations of those coordinations, in and by means of language. The form in which resonance is recognised is itself an interpretation of physical manifestations (postures, gestures, words, etc.) mediated by experience of community practices.

Why might it be worthwhile to attend to the epistemology of JPFs? In the first instance, it is possible to fool ourselves into believing that what we think we know is more firmly founded than in fact is the case, because an espoused method may be more of a smokescreen than a magnifying lens. Secondly, attempting to describe how most people enquire enables us to refine what we do, to make it more precise, and to employ it more systematically. Thirdly, it provides the basis for a research paradigm which lies at the heart of most other explicit paradigms. The result is an approach for practitioners seeking to develop their practices so as to empower their students to employ their powers fully and effectively.

Most importantly, attending to the epistemology of JPFs empowers us as practitioners to work on, to *research* our practice (such as teaching) without being disempowered by the demands of formal research methods elaborated in other places for use in other conditions by other people.

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